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10/530,976

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Kuniaki Utsumi

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EXAMINER

NGUYEN, TU X

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/530,976	Applicant(s) UTSUMI ET AL.	
	Examiner TU X. NGUYEN	Art Unit 2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-65 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 34,40,48-50,56 and 64-65 is/are rejected.
- 7) ☐ Claim(s) 35-39,41-47,51-55 and 57-63 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/12/05,12/17/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

Figures 43-44 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 34, 40, 48-50, 56 and 64-65, are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant admitted prior art.

Regarding claim 34, the Applicant admitted prior art discloses a wireless communication system, comprising: a control apparatus; at least one relay apparatus connected with the control apparatus via an optical transmission path; and a plurality of wireless communication

terminals communicating wirelessly with the relay apparatus; wherein: the control apparatus comprises: a first optical transmitting section for converting a downstream electric signal into a downstream optical signal and transmitting the downstream optical signal to the relay apparatus via the optical transmission path, and a first optical receiving section for converting an upstream optical signal transmitted from the relay apparatus via the optical transmission path into an upstream electric signal; the relay apparatus comprises: a second optical receiving section for converting the downstream optical signal transmitted from the control apparatus via the optical transmission path into the downstream electric signal; a transmitting/receiving antenna section for transmitting the downstream electric signal converted by the second optical receiving section to the wireless communication terminal as a wireless signal, and receiving a wireless signal transmitted from the wireless communication terminal as the upstream electric signal; and a second optical transmitting section for converting the upstream electric signal received by the transmitting/receiving antenna section into the upstream optical signal and transmitting the upstream optical signal to the control apparatus via the optical transmission path (see page 1 line 11 through page 2 line 12); and the wireless communication system further comprises wireless signal level restriction means for attenuating the level of a wireless signal transmitted or received by the relay apparatus such that a receiving level of the wireless signal received by the relay apparatus is kept within a predetermined range (see page 5 lines 16-24).

Regarding claims 40 and 56, the Applicant admitted prior art discloses the wireless signal level restriction means includes a level attenuation section for attenuating the wireless

signal to such a level that the upstream optical signal converted by the second optical transmitting section is not distorted (see page 5 lines 16-24).

Regarding claims 48 and 64, the Applicant admitted prior art discloses wherein wireless signals used by each of the plurality of wireless communication terminals have at least two different frequencies (see page 6 lines 15-20).

Regarding claim 49, the Applicant admitted prior art discloses a relay apparatus connected with a control apparatus via an optical transmission path and wirelessly communicating with a plurality of wireless communication terminals, the relay apparatus comprising: an optical receiving section for converting a downstream optical signal transmitted from the control apparatus via the optical transmission path into a downstream electric signal; a transmitting/receiving antenna section for transmitting the downstream electric signal converted by the optical receiving section to the wireless communication terminals to as a wireless signal, and receiving a wireless signal transmitted from the wireless communication terminals as an upstream electric signal; an optical transmitting section for converting the upstream electric signal received by the transmitting/receiving antenna section into an upstream optical signal and transmitting the upstream optical signal to the control apparatus via the optical transmission path (see page 1 lines 11 through page 2 line 12); and

wireless signal level restriction means for attenuating the level of a wireless signal transmitted or received by the transmitting/receiving antenna section such that a receiving level of the wireless signal received by the transmitting/receiving antenna section is kept within a predetermined range (see page 5 lines 16-24).

Regarding claim 50, the Applicant admitted prior art discloses a control apparatus; at least one relay apparatus connected with the control apparatus via an optical transmission path; and a plurality of wireless communication terminals communicating wirelessly with the relay apparatus; wherein: the control apparatus comprises: a first optical transmitter operable to convert a downstream electric signal into a downstream optical signal and transmit the downstream optical signal to the relay apparatus via the optical transmission path, and a first optical receiver operable to convert an upstream optical signal transmitted from the relay apparatus via the optical transmission path into an upstream electric signal; the relay apparatus comprises: a second optical receiver to operable to convert the downstream optical signal transmitted from the control apparatus via the optical transmission path into the downstream electric signal; a transmitting/receiving antenna section operable to transmit the downstream electric signal converted by the second optical receiver to the wireless communication terminal as a wireless signal, and receive a wireless signal transmitted from the wireless communication terminal as the upstream electric signal; and a second optical transmitter operable to convert the upstream electric signal received by the transmitting/receiving antenna section into the upstream optical signal and transmit the upstream optical signal to the control apparatus via the optical transmission path (see page 1 line 11 through page 2 line 12); and

the wireless communication system further comprises a wireless signal level restrictor operable to attenuate the level of a wireless signal transmitted or received by the relay apparatus such that a receiving level of the wireless signal received by the relay apparatus is kept within a predetermined range (see page 5 lines 16-24).

Regarding claim 65, the Applicant admitted prior art discloses a relay apparatus connected with a control apparatus via an optical transmission path and wirelessly communicating with a plurality of wireless communication terminals, the relay apparatus comprising: an optical receiver operable to convert a downstream optical signal transmitted from the control apparatus via the optical transmission path into a downstream electric signal; a transmitting/receiving antenna section operable to transmit the downstream electric signal converted by the optical receiver to the wireless communication terminals to as a wireless signal, and receive a wireless signal transmitted from the wireless communication terminals as an upstream electric signal; an optical transmitter operable to convert the upstream electric signal received by the transmitting/receiving antenna section into an upstream optical signal and transmit the upstream optical signal to the control apparatus via the optical transmission path (see page 1 line 11 through page 2 line 12); and

a wireless signal level restrictor operable to attenuate the level of a wireless signal transmitted or received by the transmitting/receiving antenna section such that a receiving level of the wireless signal received by the transmitting/receiving antenna section is kept within a predetermined range (see page 5 lines 16-24).

Claims 36, 41, 43-47, 52, 57 and 63, are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant admitted prior art in view of Olsen (US Patent 5771462).

Regarding claims 36 and 52, the Applicant admitted prior art fails to teach a signal dividing section, provided in the control apparatus, for dividing the downstream electric signal; the signal dividing section divides the downstream electric signal and thus attenuates the level

of the downstream electric signal so as to narrow a communicable area of the relay apparatus, and thus allows the level of a wireless signal transmitted by a wireless communication terminal existing in the communicable area to be within the predetermined range; and the first optical transmitting sections convert the downstream electric signals divided by the signal dividing section into downstream optical signals.

Olsen discloses a signal dividing section, provided in the control apparatus, for dividing the downstream electric signal; the signal dividing section divides the downstream electric signal and thus attenuates the level of the downstream electric signal so as to narrow a communicable area of the relay apparatus, and thus allows the level of a wireless signal transmitted by a wireless communication terminal existing in the communicable area to be within the predetermined range; and the first optical transmitting sections convert the downstream electric signals divided by the signal dividing section into downstream optical signals (see fig.1B). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of the Applicants admitted prior art with the above teaching of Olsen in order to divide the simultaneous downstream signals under large traffic conditions with error free (as suggested by Olsen, see abstract).

Regarding claim 41, 47, 57 and 63, the Applicant admitted prior art fails to teach (a) a delay time required for a signal transmitted from the control apparatus to be transmitted via each of the adjacent relay apparatuses onto the wireless communication terminal existing in a region where the communicable areas overlap each other, and (b) a delay time required for a signal transmitted from the control apparatus to be transmitted via the relay apparatus adjacent to the each relay apparatus onto the wireless communication terminal existing in the region

where the communicable areas overlap each other, is within a predetermined time period (see fig.2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of the Applicants admitted prior art with the above teaching of Olsen in order to provide the physical coverage area of a single base station is increased by using multiple transceivers where each transceiver is connected to appropriate delay and selection units (as suggested by Olsen, see col.1 lines 6-11).

Regarding claim 43, the modified Applicants admitted prior art discloses the transmitting/receiving antenna section has a directivity toward a relay apparatus, among the two adjacent relay apparatuses, which is connected with the control apparatus via a longer optical transmission path than the optical transmission path which connects the control apparatus and the relay apparatus including the transmitting/receiving antenna section (see Olsen, fig.1C).

Regarding claim 44, the modified Applicants admitted prior art discloses an optical splitting/coupling section for splitting the optical transmission path which connects the control apparatus and each of the relay apparatuses, wherein one end of the split optical transmission path is connected to the relay apparatus and the other end is connected to another optical splitting/coupling section (see Olsen, fig.1C).

Regarding claim 45, the modified Applicants admitted prior art discloses an optical splitting/coupling section for splitting the optical transmission path which connects the control apparatus and each of the relay apparatuses, wherein the optical splitting/coupling section splits one optical fiber connected to the control apparatus into at least a predetermined number

of optical fibers, and each of the split optical fibers is connected to a relay apparatus (see Olsen, fig.1C).

Regarding claim 46, the modified Applicants admitted prior art discloses the level adjustment means adjusts the level of the wireless signal such that the delay times are each a maximum delay time tolerated by the wireless communication system (see Olsen, col.8 lines 14-35).

Allowable Subject Matter

Claims 35, 37-39, 42, 51 and 53-55, objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 35 and 51, the prior art fails to teach to the wireless communication terminals use a respective channel, the predetermined range is smaller than a difference between (a) a leakage ratio which is the ratio of the level of a wireless signal using the respective channel with respect to the level of a frequency component leaking to another channel different from the respective channel, and (b) a signal to noise ratio which is the ratio of the level of a leakage signal from a wireless communication terminal using another channel different from the respective channel with respect to the level of the wireless signal using the respective channel.

Regarding claims 37 and 53, the prior art fails to teach generating a pilot signal to be transmitted while being superposed on the downstream electric signal; the first optical

transmitting section converts the downstream electric signal having the pilot signal superposed thereon into a downstream optical signal; the relay apparatus further comprises: a pilot signal detection section for detecting the level of the pilot signal superposed on the downstream electric signal converted by the second optical receiving section; and a level control section for controlling the level of the wireless signal such that the level of the pilot signal detected by the pilot signal detection section is constant; and the pilot signal generation section increases the level of the generated pilot signal so as to narrow a communicable area of the relay apparatus, and thus allows the level of a wireless signal transmitted by a wireless communication terminal existing in the communicable area to be within the predetermined range.

Regarding claims 38-39 and 54-55, the prior art fails to teach a monitoring section for monitoring whether or not the quality of the upstream electric signal converted by the first optical receiving section fulfills a predetermined condition; and a level control section for, when the monitoring section determines that the quality of the upstream electric signal does not fulfill the predetermined condition, lowering the level of the downstream electric signal / bias current which is to be input to the first optical transmitting section so as to reduce an optical modulation index; and the level control section reduces the optical modulation index and thus attenuates the power of the downstream optical signal so as to narrow a communicable area of the relay apparatus, and thus allows the level of a wireless signal transmitted by a wireless communication terminal existing in the communicable area to be within the predetermined range.

Regarding claim 42, the prior art fails to teach where two relay apparatuses adjacent to each other is one set, one set of adjacent really apparatuses communicate using a frequency which is different from the frequency used by another set of adjacent relay apparatuses.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed Tu Nguyen whose telephone number is 571-272-7883.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Urban, can be reached at (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Tu X Nguyen/

Primary Examiner, Art Unit 2618

3/20/08